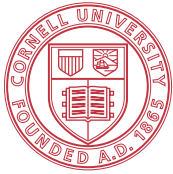


# BERRY CROPS



Cornell University



## Blueberry Scorch Disease

Blueberry scorch virus (BIScV)

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### Introduction

Scorch is a viral disease that is a considerable threat to New York blueberry (*Vaccinium* spp.) production. Caused by Blueberry scorch virus (BIScV), the disease is spread through clonal propagation of infected plant material and by aphids. There is no cure once plants become infected and no blueberry variety is immune, though some are tolerant to the virus. Scorch results in stunted bushes with chlorotic, brown-tipped leaves, twig dieback and flower death (Fig. 1). Infected plants typically yield poorly, both in quantity and quality of fruit. The best control measure is to rogue infected bushes and establish plants derived from clean, certified virus-tested planting stock.

### Causal Agent

Blueberry scorch virus (BIScV) belongs to the genus *Carlavirus* in the family *Flexiviridae*. Virus particles are flexuous rods, normally 610-700 nm long and 12-15 nm in diameter. Blueberry scorch virus occurs in New York, New Jersey, Pennsylvania, Connecticut, Massachusetts, Michigan,

Oregon, Pennsylvania, and Washington, as well as in Europe. Multiple strains of BIScV exist, with isolates on the east and west coasts tending to be unique to each region.

### Host Range, Impact, and Symptoms

Blueberries and other *Vaccinium* spp. such as cranberry (*V. macrocarpon*) and the wild lowbush blueberry (*V. angustifolium*) are the only known natural hosts of BIScV. Although wild *Vaccinium* spp. grow in New York, these are not considered important reservoirs of the virus.

Virus symptoms may be sporadic, depending on variety, time of year, weather, and length of infection. Often, infected plants have no symptoms because the variety is tolerant or because the infection is latent or masked. Flower, leaf and twig necrosis are typical symptoms of BIScV (Fig. 2). Such symptoms can resemble frost damage or infection with other pathogens. Leaves may develop oak leaf line patterns, foliar chlorosis, yellow or red margins, or red line patterns in late summer and fall (Fig. 3).



Photo: K. Cox

**Figure 1.** Characteristic blighted flowers and twig dieback on scorch-infected highbush blueberry.



Photo: K. Cox

**Figure 2.** Necrotic tissue on highbush blueberry infected with scorch.

Yield loss can exceed 80% on plants with blighted flowers and twig dieback. Infected plants without these symptoms are considered tolerant because they can produce acceptable yields even when infected. However, infected plants that are symptomless will serve as reservoirs of the virus and adversely impact susceptible varieties in the planting. This should be taken into account when establishing new plantings near older fields that may be infected. Cuttings taken from infected bushes are more difficult to root.

Although researchers in Washington have identified tolerance in several Northern highbush varieties including 'Bluecrop', in New Jersey, 'Bluecrop' was found to be highly susceptible. This underlines the need in New York for testing varieties for their susceptibility to the BISCv strains found in our growing region.

## Transmission and Spread

Infected nursery stock is the most common source of introduction of BISCv into a new planting. Fields with random or along-the-row distribution of infected plants likely had the virus introduced as infected nursery stock. Initially, the virus establishes a local infection within the shoot tip, and then, over months or years, infection spreads systemically throughout the plant.

Aphids disperse the virus to adjacent plants in a clustered or circular fashion. Transmission of BISCv by aphids is non-persistent; the virus is carried in the aphid's stylet (mouthparts) for only a few hours. However, spread can be exponential—aphids pick up the virus particles within 1-2 minutes of probing on an infected plant and can then transmit the virus to another plant within 1-2 minutes of probing on it—especially when winged aphids migrate through a planting. The species of

aphids known to transmit BISCv include *Ericaphus fimbriata* (= *Fimbriaphus fimbriata*), *Illinoia pepperi* and *Myzus persicae* (green peach aphid).

Following establishment of the virus in a planting, aphid spread can increase the number of infected plants significantly. However, aphid numbers are poor predictors of the rate of virus spread probably because aphids that have settled to feed are not moving through the planting and transmitting virus.

## Management

The best way to prevent scorch is to purchase planting material derived from certified, virus-tested stocks and to separate these plantings from those that may be infected. Neighboring plantings may be sources of the virus. If BISCv is suspected in a planting, it is important to ascertain the prevalence of the virus using laboratory-based diagnostic procedures. Because infections can remain latent, infected plants do not always show symptoms, especially in the first two years after infection (Fig. 4), so tests by a reputable diagnostic laboratory are necessary to identify BISCv. If only a few plants are infected, roguing infected plants is sufficient to maintain an acceptably low incidence of scorch. Suckers from infected plants can be a source of virus inoculum for aphid-mediated spread, so removal of suckers and as much of the infected root system as possible is critical. Blueberry plantings with a high incidence of disease (>30%) should be removed entirely.

Aphid control using insecticides provides little to no protection against non-persistent viruses, such as BISCv. Insecticide-based control measures are ineffective or even counterproductive since spraying can encourage aphid flight to nearby plants and can result in virus spread.



Photo: K. Cox

Figure 3. Foliar red margins on BISCv-infected highbush blueberry.



Photo: K. Cox

Figure 4. Unproductive, symptomatic (foreground) and asymptomatic (background) BISCv-infected highbush blueberry.